Potential Next Steps for Water Retention Studies for the Upper Chehalis Site

Activities that are needed to move this project forward in a cost effective manner providing decision makers reliable information over the next 2 to 3 years. If sufficient funds are available, it would be beneficial to move the geotechnical and engineering items of priority two to priority one.

Priority One $1.1 to $1.5 million

- **Stream Gauging at Mainstem Water Retention site $30,000**
  - Minimum of 1 year of monitoring
- **Refine and Complete the Chehalis River Hydraulic Model, Northwest Hydraulics Consultants $400,000 - $500,000**
  - HEC-RAS model refinement for current Airport levee. Run model with and w/o Corps levees and mainstem water retention $25,000
  - HEC-RAS model calibration for the 2009 flood event. Run model with and w/o Corps levees and mainstem water retention $30,000
  - Extend HEC-RAS model approximately 60 miles from Grand Mound to the mouth, including field surveys, cross-sections, and LiDAR. $340,000
  - Consultation and coordination with stakeholders $25,000
- **Fish passage design elements $150,000 - $200,000**
  - Incorporate updated information from fisheries studies
  - Determine Instream flow, design intake structures and update costs
  - Design fish passage alternatives and update costs
- **Environmental and Fisheries Studies to follow Anchor QEA Report $450,000 -$700,000**
  - Complete environmental and fisheries studies recommended by Anchor QEA Report
  - Analyze flow augmentation for wetland restoration
- **Update Benefits-Cost Analysis $60,000 - $80,000**
  - Incorporate new information from above work consistent with Corps methodology

Priority Two $1 to $1.25 million

- **Geotechnical Investigations - site borings $450,000 -$600,000**
  - Core drillings, test pits and trenches to assess construction material availability
  - Borings in right abutment area for foundation and tunnel design
  - Field investigations, lab tests and analysis
- **Engineering Design of Mainstem Water Retention consistent with Corps of Engineers procedures $500,000 -$600,000**
  - Design refinement to align with 10% Corps criteria $300,000
  - Update design of foundations, incorporating updated Geologic information $200,000
- **Ecosystem Costs and Benefits with Earth Economics $80,000 - $100,000**
  - Valuation of ecosystem benefits related to water retention and Corps B/C methodology
- **Update Benefits-Cost Analysis $20,000 - $30,000**
  - Incorporate new information from above work consistent with Corps methodology

The work below would likely fall beyond the next 2 to 4 year time frame

Additional Future Work if Plan remains viable (multi – million effort)

- **Hydrology Studies for probable maximum flood (PMF)**
- **Assess and categorize Permitting Requirements**
- **Complete Geotechnical investigation and seismic analysis**
- **Final Engineering Design of Water Retention Structures**
- **Detailed Environmental Studies Required for Permitting and Mitigation and consultation with stakeholders and agencies**
- **Update Benefit – Cost Analysis**